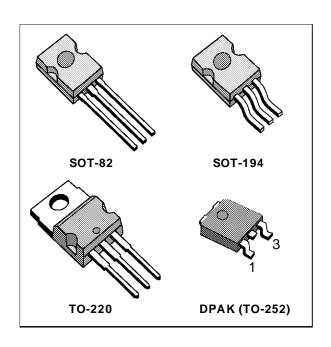


# **VERY LOW DROP 1A REGULATOR**

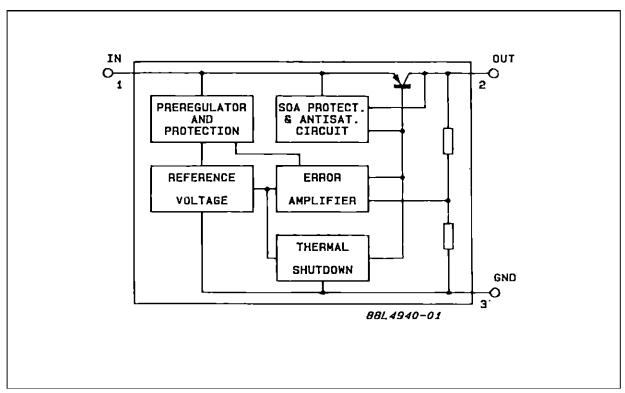
- LOW DROPOUT VOLTAGE (450 mV typ at 1A)
- VERY LOW QUIESCENT CURRENT
- THERMAL SHUTDOWN
- SHORT CIRCUIT PROTECTION
- REVERSE POLARITY PROTECTION

#### **DESCRIPTION**

The L4941 is a three terminal 5 V positive regulator available in TO-220, SOT-82, SOT-194 and DPAK packages, making it useful in a wide range of the industrial and consumer applications. Thanks to its very low input/output voltage drop, this device is particularly suitable for battery powered equipment, reducing consumption and prolonging battery life. It employs internal current limiting, antisaturation circuit, thermal shut-down and safe area protection.

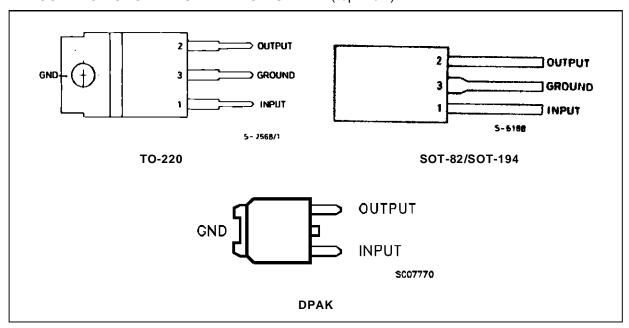


### **BLOCK DIAGRAM**



April 1994 1/13

## PIN CONNECTIONS AND ORDERING NUMBER (top view)



ORDERING NUMBERS	OUTPUT VOLTAGE	PACKAGE
L4941BV	5V	TO-220
L4941BX	5V	SOT-82
L4941BS	5V	SOT-194
L4941BDT	5V	DPAK

### **ABSOLUTE MAXIMUM RATINGS**

Symbol	Parameter	Value	Unit
Vi	Forward Input Voltage	30	V
$V_{iR}$	Reverse Input Voltage ( $R_0 = 100 \Omega$ )	<b>–</b> 15	V
Io	Output Current	Internally Limited	
P <sub>tot</sub>	Power Dissipation	Internally Limited	
T <sub>j</sub> , T <sub>stg</sub>	Junction and Storage Temperature	- 40 to 150	°C

### THERMAL DATA

			SOT-82 SOT-194 DPAK	TO-220	
R <sub>thj-case</sub>	Thermal Resistance Junction-case	Max	8	3	°C/W
R <sub>thi-amb</sub>	Termal resistance Junction-ambient	Max	100	50	°C/W



## **TEST CIRCUITS**

Figure 1 : DC Parameters.

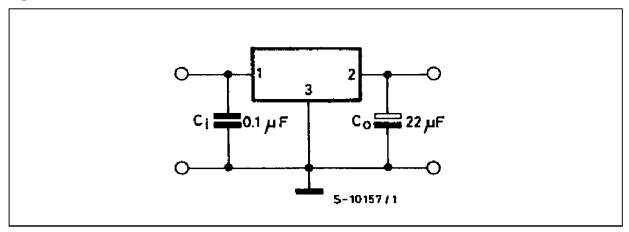


Figure 2: Load Regulation.

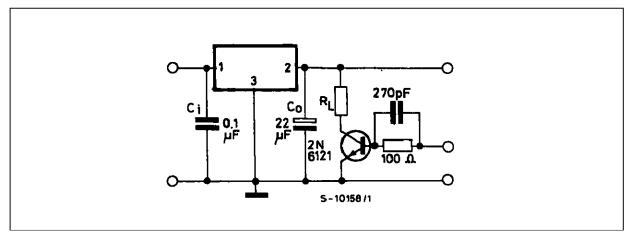
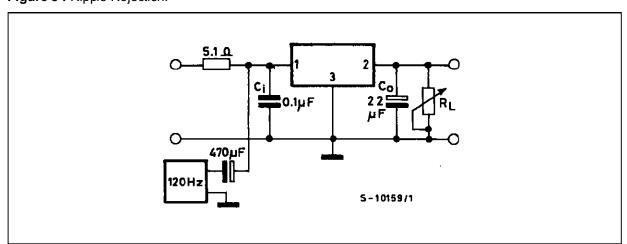


Figure 3 : Ripple Rejection.



**ELECTRICAL CHARACTERISTICS** (refer to the test circuits  $T_j$  = 25 °C,  $C_i$  = 0.1  $\mu$ F,  $C_o$  = 22  $\mu$ F, unless otherwise specified)

Symbol	Parameter	Test Cond	Min.	Тур.	Max.	Unit	
Output Vo	oltage		5				
Input Volt	tage (unless otherwise spe		7				
Vo	Output Voltage	$I_o = 5 \text{ mA to } 1 \text{ A}$ $V_i = 6 \text{ V to } 14 \text{ V}$	4.8	5	5.2	V	
Vi	Operating Input Voltage	$I_o = 5 \text{ mA}$				16	V
ΔV <sub>o</sub>	Line Regulation	$V_i = 6 \text{ V to } 16 \text{ V}$ $I_o = 5 \text{ mA}$			5	20	mV
ΔV <sub>o</sub>	Load Regulation	$I_o = 5 \text{ mA to } 1 \text{ A}$ $I_o = 0.5 \text{ A to } 1 \text{ A}$		8 5	20 15	mV	
ΙQ	Quiescent Current	V <sub>i</sub> = 6 V	$I_o = 5 \text{ mA}$		4	8	mA
		V 1 = 0 V	I <sub>o</sub> = 1 A		20	40	
ΔlQ	Quiescent Current	V <sub>i</sub> = 6 V to 14 V	$I_o = 5 \text{ mA}$			3	mA
	Change	I <sub>o</sub> = 1 A				- 10	""^
$V_d$	Dropout Voltage	I <sub>o</sub> = 0.5 A			250	450	mV
		I <sub>o</sub> = 1 A			450	700	1110
$\Delta V_o$	Output Voltage Drift				0.6		mV/°C
ΔΤ							
SVR	Supply Voltage Rejection	f = 120 Hz I <sub>o</sub> = 0.5 A	58	68		dB	
Isc	Short Circuit Current	V <sub>i</sub> = 14 V			1.6	2.0	Α
	Limit	Limit $V_i = 6 \text{ V}$			1.8	2.2	] ^
Z <sub>o</sub>	Output Impedance	f = 1 kHz I <sub>o</sub> = 0.5 A		30		mΩ	
e <sub>N</sub>	Output Noise Voltage	B = 100 Hz to 100 k	Hz		30		μV/V <sub>o</sub>

Figure 4 : Dropout voltage vs. Output Current.

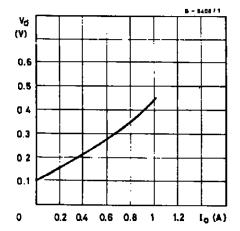


Figure 5 : Dropout Voltage vs. Temperature.

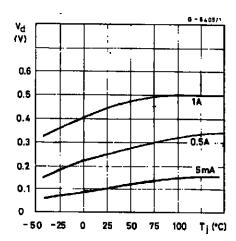


Figure 6 : Output voltage vs. Temperature.

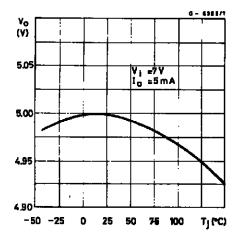


Figure 8: Quiescent Current vs.Input Voltage.

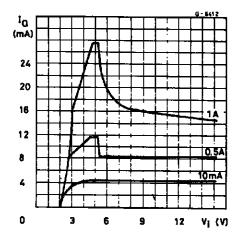


Figure 10 : Short-circuit Current vs. Temperature.

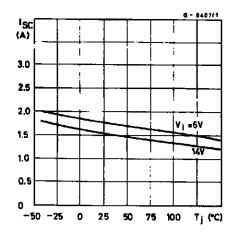


Figure 7: Quiescent Current vs. Temperature

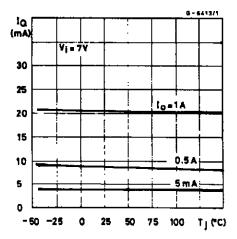


Figure 9: Quiescent Current vs.Output Current.

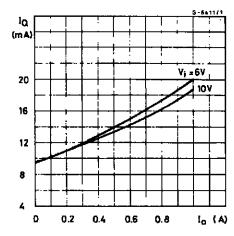


Figure 11: Peak Output Current vs. Input/Output Differential Voltage.

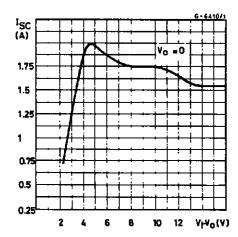
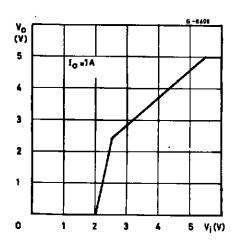


Figure 12: Low Voltage Behavior.



**Figure 14 :** Supply Voltage Rejection vs. Output Current.

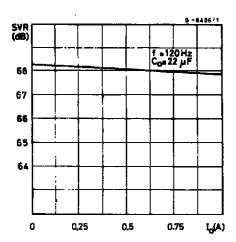
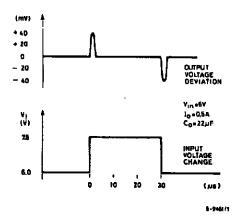


Figure 16: Line Transient Response.



**Figure 13 :** Supply Voltage Rejection vs. Frequency

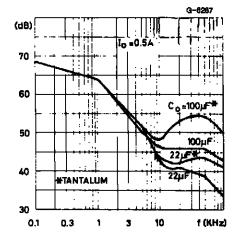


Figure 15: Load Dump Characteristics.

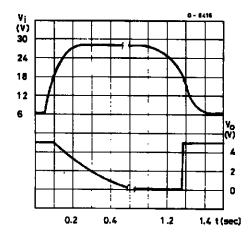


Figure 17: Load Transunt Response.

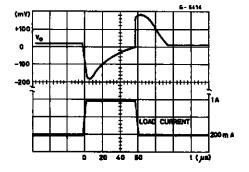


Figure 18: Total Power Dissipation (TO-220).

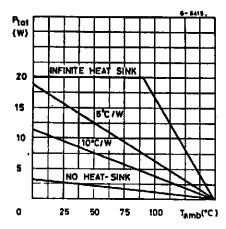
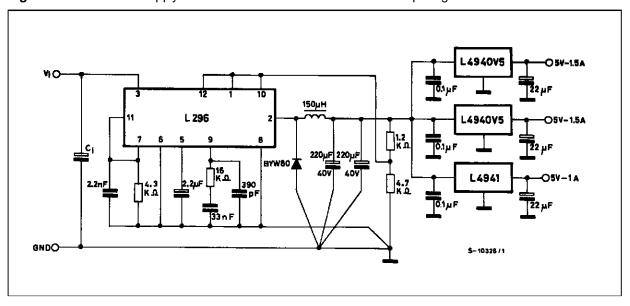


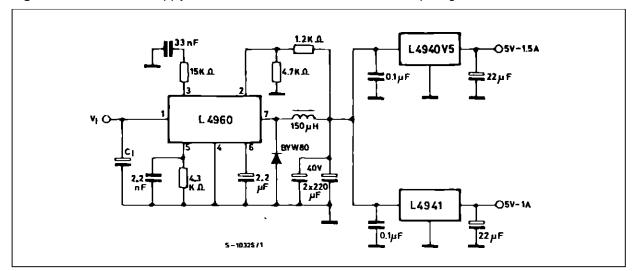
Figure 19: Distribued Supply with On-card L4940 and L4941 Low-drop Regulators.



#### **ADVANTAGES OF THESE APPLICATIONS ARE:**

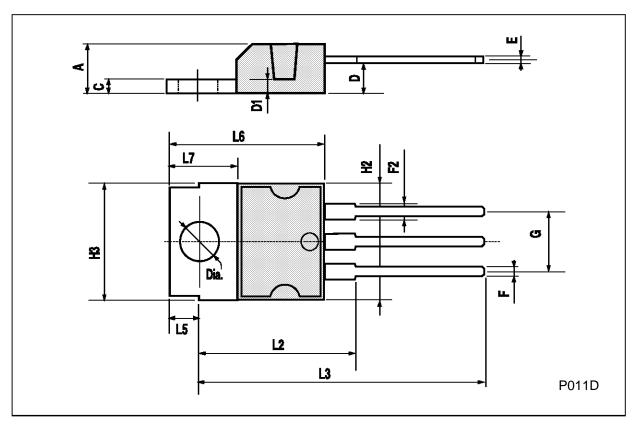
- On card regulation with short-circuit and thermal protection on each output.
- Very high total system efficiency due to the switching preregulation and very low-drop postregulations.

Figure 20: Distribued Supply with On-card L4940 and L4941 Low-drop Regulators.



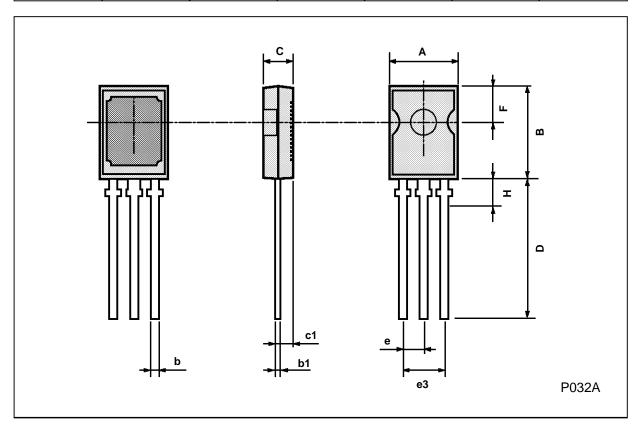
# **TO-220 MECHANICAL DATA**

DIM.		mm			inch		
DIIVI.	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	
А			4.8			0.189	
С			1.37			0.054	
D	2.4		2.8	0.094		0.110	
D1	1.2		1.35	0.047		0.053	
Е	0.35		0.55	0.014		0.022	
F	0.8		1.05	0.031		0.041	
F2	1.15		1.4	0.045		0.055	
G	4.95	5.08	5.21	0.195	0.200	0.205	
H2			10.4			0.409	
НЗ	10.05		10.4	0.396		0.409	
L2		16.2			0.638		
L3	26.3	26.7	27.1	1.035	1.051	1.067	
L5	2.6		3	0.102		0.118	
L6	15.1		15.8	0.594		0.622	
L7	6		6.6	0.236		0.260	
Dia.	3.65		3.85	0.144		0.152	



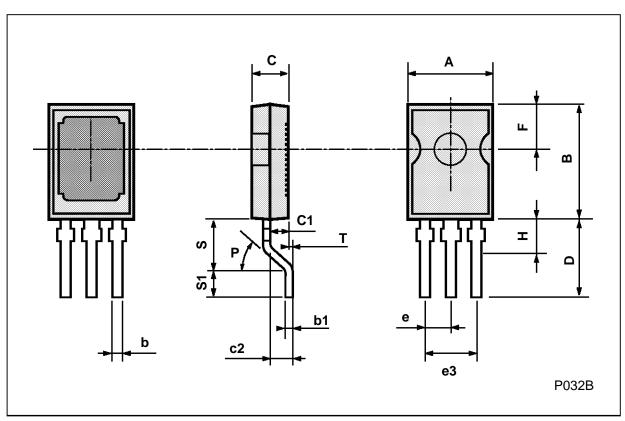
# **SOT-82 MECHANICAL DATA**

DIM.	mm			inch		
Dim.	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
А	7.4		7.8	0.291		0.307
В	10.5		11.3	0.413		0.445
b	0.7		0.9	0.028		0.035
b1	0.49		0.75	0.019		0.030
С	2.4		2.7	0.04		0.106
c1		1.2			0.047	
D		15.7			0.618	
е		2.2			0.087	
e3		4.4			0.173	
F		3.8			0.150	
Н			2.54		0.100	



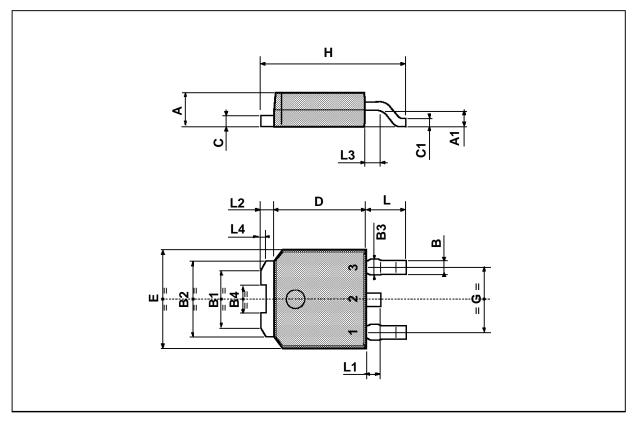
# **SOT-194 MECHANICAL DATA**

DIM.		mm		inch		
DIIVI.	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
А	7.4		7.8	0.291		0.307
В	10.5		11.3	0.413		0.445
b	0.7		0.9	0.028		0.035
b1	0.49		0.75	0.019		0.030
С	2.4		2.7	0.094		0.106
c1		1.2			0.047	
c2		1.3			0.051	
D		6			0.236	
е		2.2			0.087	
e3		4.4			0.173	
F		3.8			0.150	
Н			2.54			0.100
Р			45°	(typ.)	-	
S		4			0.157	
S1		2			0.079	
Т		0.1			0.004	



# **TO-252 (DPAK) MECHANICAL DATA**

DIM.		mm			inch		
Dilvi.	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	
А	2.2		2.4	0.086		0.094	
A1	0.9		1.1	0.035		0.043	
В	0.64		0.8	0.025		0.031	
B1	3.4		3.6	0.133		0.141	
B2	5.2		5.4	0.204		0.212	
В3			0.9			0.035	
B4	1.9		2.1	0.074		0.082	
С	0.48		0.6	0.018		0.023	
C1	0.45		0.6	0.017		0.023	
D	6		6.2	0.236		0.244	
E	6.4		6.6	0.252		0.260	
G	4.4		4.6	0.173		0.181	
Н	9.35		10.1	0.368		0.397	
L	2.55		3.05	0.100		0.120	
L1	0.6		1	0.023		0.039	
L2		0.8			0.031		
L3	0.8		1.2	0.031		0.047	
L4	0.3		0.45	0.012		0.017	



Information furnished is believed to be accurate and reliable. However, SGS-THOMSON Microelectronics assumes no responsability for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may results from its use. No license is granted by implication or otherwise under any patent or patent rights of SGS-THOMSON Microelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and r eplaces all information previously supplied. SGS-THOMSON Microelectronics products are not authorized for use ascritical components in life support devices or systems without express written approval of SGS-THOMSON Microelectonics.

© 1994 SGS-THOMSON Microelectronics - All Rights Reserved

SGS-THOMSON Microelectronics GROUP OF COMPANIES

Australia - Brazil - France - Germany - Hong Kong - Italy - Japan - Korea - Malaysia - Malta - Morocco - The Netherlands - Singapore - Spain - Sweden - Switzerland - Taiwan - Thailand - United Kingdom - U.S.A

